HOLARCTIC SAWFLIES (HYMENOPTERA : SYMPHYTA)

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CONTENTS

SYNOPSIS

A comparative study of the boreal sawflies of the old and new worlds reveals that 134 species can now be recorded from both : 34 of these are additions to the N. American fauna ; and 33 more were previously treated as different species in the two worlds. Furthermore 30 are presumed to have been introduced into N. America from Europe and 1 into Europe from N. America. These holarctic species show several different biogeographical patterns.

1. INTRODUCTION

In 1956 a Leverhulme Research Fellowship enabled me to spend five months in North America. One of my objects was to correlate the boreal and arctic sawflies of North America with those of Eurasia.

My grateful thanks are due to Mr. G. P. Holland, Head of the Section on Insect Taxonomy, of the Entomological Research Institute, Ottawa, for allowing me access to the named collections there, including the types, and to the unworked material. This latter consisted mainly of the rich collections brought back by the Institute's staff since 1947 from many parts of the North American Arctic in the course of their Northern Insect Survey (Freeman, 1952).

Mr. Holland also kindly arranged for me to stay at the Defence Research Northern Laboratory, Fort Churchill, Manitoba, on the west coast of Hudson Bay at about 58° 44′ N. lat. for three weeks in June and July. There I was able to make collections at the edge of the tundra to compare with similar material I had already collected at Abisko in Swedish Lapland in 1948 and 1954. Apart from this material, which is in the British Museum, the North American material dealt with in this paper is deposited (unless otherwise stated) in the Entomology Research Institute, Ottawa, Canada. I am also indebted to Dr. J. Gates Clarke for letting me examine the types of Kincaid, Marlatt and Rohwer in the U.S. National Museum, Washington, Dr. Herbert H. Ross the types of MacGillivray at Urbana, Illinois, Dr. René Malaise (Stockholm) for

freely letting me borrow types and other specimens from his own Lapland and Kamtchatka collections, and Mr. E. Lindqvist (Helsingfors) for many loans and gifts of representatives of species he has described from North Europe. The Greenland material referred to is at Copenhagen and was kindly lent to me by Dr. Børge Petersen in 1959.

2. BIOGEOGRAPHICAL TERMS

Owing to the lack of agreement as to how different biogeographical terms should be applied it is necessary to define how I am using them here.

Holarctic: occurring in at least some part of both nearctic and palaearctic regions.

Arctic : associated with tundra beyond or above the tree-line.

Alpine : similar to the arctic type of fauna, but above the tree-line on mountains distant from regions of northern arctic tundra.

Montane : other types of mountain fauna above the tree-line.

Subarctic : associated with the boreal coniferous forest belt (taiga).

Subalpine : associated with subalpine coniferous forest belt.

Circumpolar : occurring in arctic tundra not only on the mainland of Fennoscandia but also eastwards across Siberia and the Bering Straits to East Canada.

Circumboreal : as the preceding (circumpolar) but associated not with tundra but mainly with the boreal forest belts.

The above terms have been applied only in the most general way as the distribution of arctic and subarctic sawflies is still very little known. In some species almost the only information available is from my own collecting in Lapland, Scotland, Switzerland and Canada. It is not therefore reasonable to apply such refinements of distributional classification as has been applied for example to the flowering plants by Hultén (1950) or Porsild (1951).

3. DISTRIBUTION PATTERNS OF HOLARCTIC SAWFLIES

(a) *Circumpolar species*

Species with holarctic distributions are diverse ecologically, but arctic species predominate and many of them are circumpolar. Benson (1961) found no less than 14 circumpolar sawflies in high alpine regions of Switzerland and this number included such high arctic species as *Amauronematus abnormis* and *A. arcticola*. Freeman (1958) estimated that 60 per cent of the Canadian arctic butterflies are holarctic in distribution and similar percentages have been estimated for many other insect groups. A specimen of *Pachynematus parvilabris* was collected from Ward Hunt Island off the north coast of Ellesmere Island, Lat. 83° 05′ N. and Long. 74° 30′ W. (less than 500 miles from the North Pole). This is even further north than Brønland Fjord, off Independence Fjord, North Greenland, about Lat. 82° N. and Long. 31° W., where *Amauronematus amentorum* (in Copenhagen Mus.) was found.

(b) *Circumboreal species*

These are of various types. *Rhogogaster viridis* for example shows no subspeciation throughout its range, but *Pachyprotasis rapae* occurs in a slightly different form in

North America than in Eurasia though the two forms are assumed to be interfertile and conspecific. Other examples are *Arge clavicornis* and *Monophadnoides geniculatus*, in both of which brown-bodied forms occur sporadically as part of N. American though never in Eurasian populations. This increase in brown or red in North American races of holarctic species also occurs in *Loderus*, *Dolerus* and *Tenthredo*.

Another kind of circumboreal distribution is shown by *Xyela alpigena*. This species is subalpine in Europe, associated with *Pinus cembra*. It has also been found in East Siberia and Japan where the same *Pinus* occurs, and presumably the *Xyela* is spread along the intervening mountains in Central Asia on the same host. In eastern North America it is associated with the closely related *P. strobus*. *X. obscura* has a similar distribution.

(c) *Incomplete holarctic distributions*

Many holarctic species are not completely circumpolar or circumboreal. The range of some transcontinental Eurasian species such as *Heptamelus ochroleuchus*, *Dolerus gessneri*, *Tenthredo devia* or *Amauronematus pravus* crosses the Bering Straits but reaches no further than the Pacific coastal regions of North America. Conversely some transcontinental North American species occur in East Asia but do not extend beyond the Pacific coastal region : *Amauronematus hulteni* for example reaches Kamtchatka and *Dolerus subfasciatus* Japan. Some forms such as *D. gessneri konowi* are restricted to the Pacific region of the two continents.

(d) *Introduced species*

It would seem that several species are holarctic now only because they were introduced accidentally by man. The species marked with an asterisk in the general account below are thought, for one or more of the following reasons, to have been introduced from Europe to America or, in one instance, from America to Europe : (i) that though widespread in Europe or Eurasia as a whole their distribution in North America is discontinuous ; they occur only sporadically in the more densely populated parts (*Macrophya punctum-album* and *Eriocampa ovata*) ; (ii) that their discovery in North America has been only recent and they have occurred suddenly in epidemic numbers (*Gilpinia hercyniae* on *Picea*, *G. frutetorum* and *Diprion similis* on *Pinus*, *Heterarthrus nemoratus*, *Profenusa thomsoni* and three other Fenusine leaf-miners in shade trees, *Dolerus nitens* and *Aneugmenus padi*) ; (iii) that they are attached to plants that have frequently been imported into North America or are not native there (*Ardis sulcata* on *Rosa*, *Pontania proxima* on *Salix fragilis*, *Hoplocampa testudinea* on *Malus pumila*, *Pristiphora abbreviata* on *Pyrus communis*, etc.) or to a plant introduced from North America to Britain (*Nematus tibialis* on *Robinia pseudacacia*).

It is significant that all except three of the examples of introduced species mentioned above are obligatory parthenogenetic species, at least in the countries where they have become established by introduction.

In some of them (e.g. *Gilpinia hercyniae*, and *Dolerus nitens*) the existence of obligatory parthenogenetic races in Europe was not even suspected until the discovery of their introduction into North America was made known.

It would seem that, other factors being equal, obligatory parthenogenetic races have a far greater chance of establishing themselves on introduction, as a single individual could give rise to a colony ; but it would also seem that such a colony might suffer in its inability to adapt itself to new conditions through lacking the interplay of selection in the recombinations of genes. (Benson, 1950 : 124–8.)

That nearly all the British Fenusini leaf-mining forest and shade trees have become established in North America may have been through the use of forest litter in packing goods.

Some of the introduced species are not associated with plants likely to have been imported whole and were probably not conveyed in litter used for packing. Species such as *Dolerus asper*, *D. nitens* and *Pachynematus clitellatus* were probably introduced into North America in ballast through the Atlantic ports. Their larvae feed on Gramineae and Cyperaceae, and they occur in just such open places on the coast as those from which the ballast was shipped from England (Lindroth, 1957).

4. NOTE ON REFERENCES AND SYMBOLS

References to species already given in Dalla Torre, 1894, Konow, 1905, the North American Catalogue of Muesebeck, Krombein & Townes, 1951, or its first supplement by Krombein, 1958, are not repeated here. It is assumed that most of the Central European species can be identified with the help of Enslin (1912–18), or Benson (1952–58) ; exact references to these works are not given unless there is a special reason such as the existence of a figure of the saw or penis valve in Benson's work. The species marked ‡ are additions to the list of North American species and those marked † were previously known as N. American but not as holarctic and usually by a different name. Species marked with an asterisk are assumed to be holarctic only through introduction from Europe or Asia to N. America, or in one instance (*Nematus tibialis*) from N. America to Europe. Species marked ♀ are obligatorily parthenogenetic, normally without functional males, in the races that are holarctic.

5. LIST OF HOLARCTIC SPECIES

Arctic and boreal sawfly species are often more variable in colour and form than those of more temperate regions, and have more abnormalities. For this reason some of the more common species such as *Amauronematus fallax*, *A. polaris*, *Nematus reticulatus* and *Pontania crassipes* have been treated by previous authors as though they were groups of species and have been divided accordingly ; and some of the more aberrant specimens have even been described as distinct species on the basis of single examples. As a result of this a false picture of the Nematinae of boreal and arctic Europe has been presented, heading towards chaos. So I have found it is necessary to treat all such European species that are based on single specimens as *species inquirendae* until more specimens can be found or their probable identity determined.

Furthermore, if for biological or other reasons it is known that two similar forms belong to separate species, it may be necessary to use characters for distinguishing

them that are extremely difficult to appreciate. But the reverse of this is not true : discrete morphological differences often occur between individuals of the same interbreeding populations and their discovery is no proof that more than one species is involved.

XYELIDAE

† *Xyela alpigena* (Strobl)

Pinicola alpigena Strobl, 1895 : 277.
Xyela brunneiceps Rohwer, **syn. n.**
Xyela kamtshatica Gussakovskij, 1935 : 363.
Xyela alpigena (Strobl) ; Benson, 1938 : 35 and fig. 4.
Xyela middlekauffi Burdick, 1961 : 343 and figs. 39 and 55.

Dr. Burdick, to whom I sent Swiss specimens of *X. alpigena* in exchange for paratypes of *X. middlekauffi*, agrees that the two are synonymous and therefore that *X. brunneiceps* is also. In Europe this species is subalpine with its host *Pinus cembra* L., and occurs presumably on the same plant across Asia to Japan. In eastern N. America Burdick gives the hostplant as the closely related *P. strobus* L.

† *Xyela obscura* (Strobl)

Pinicola julii var. *obscura* Strobl.
Xyela japonica Rohwer, 1910 : 99.
Xyela obscura (Strobl) ; Benson, 1960 (*c*) : 110–111, figs. 2 and 3.
Xyela pini Rohwer ; Burdick, 1961 : 327, figs. 45 and 62.

This species, like *X. alpigena*, is also subalpine in Europe and extends eastwards to Japan and N. America. In Europe it is attached to *Pinus mugo* Terra, but in N. America it is known from *Pinus banksiana* Lamb, *P. palustris* Mill., *P. ponderosa* Laws. and *P. virginiana* Mill. The synonymy of *X. pini* with *X. obscura* was suggested to me by Dr. Burdick.

PAMPHILIIDAE

* *Acantholyda erythrocephala* (L.)

Europe and North Asia to Japan, introduced into North America.
Pinus.

SIRICIDAE

Sirex cyaneus Fabricius

Circumboreal species. *Sirex varipes* Walker is *not* a synonym of this species (Benson, 1943).
Coniferae.

†* *Sirex noctilio* Fabricius

Sirex noctilio Fabricius ; Benson, 1943 : 37 and fig. 1*a*.

Europe, North Asia and Manitoba (? introduced).
Coniferae.

†* ***Sirex juvencus*** L.

Sirex juvencus L.; Benson, 1943 : 37 and fig. 1*b*.

Europe, North Asia, also Labrador and Newfoundland (? introduced).
Coniferae.

† ***Urocerus gigas flavicornis*** (Fabricius)

Urocerus gigas flavicornis (Fabricius); Benson, 1943 : 39.

North American subspecies of Eurasian species.
Coniferae.

Xeris spectrum (L.)

Circumboreal species.
Coniferae.

CEPHIDAE

Cephus pygmaeus (L.)

Europe, Asia Minor, Caucasus to Turkestan, introduced into North America.
Gramineae especially cultivated wheat, barley and rye.

* ***Trachelus tabidus*** (Fabricius)

Europe, North Africa, Asia Minor, Caucasus and south-west Asia, introduced into North America.
Gramineae especially cultivated wheat and rye.

DIPRIONIDAE

* ***Neodiprion sertifer*** (Geoffroy)

North and Central Europe to Caucasus, Corea and Japan. Introduced into north-east America, westwards to Ohio.
Pinus.

* ***Diprion similis*** (Hartig)

North and Central Europe. Introduced into north-east America.
Pinus.

* ***Gilpinia frutetorum*** (Fabricius)

North and Central Europe. Introduced into north-east America.
Pinus.

* ***Gilpinia hercyniae*** (Hartig) ♀

North and Central Europe. Introduced into East Canada.
Picea

ARGIDAE

* *Arge ochropus* (Gmelin)

Europe, West and Central Siberia, Asia Minor, North Persia, Caucasus and Transcaspia, introduced into Ontario.

Rosa.

† *Arge clavicornis* (Fabricius)

A. fuscipes (Fallén) **syn. n.**

The North American form is extremely variable in colour and may have its abdomen entirely metallic blue, more or less marked with yellow or almost entirely yellow. The European forms are *A. clavicornis expansa* (Klug) **comb. n.** of subarctic-subalpine regions (Benson, 1951 : 34) and *A. clavicornis fuscipes* (Fallén) **comb. n.** of temperate parts of Central and Western Europe and are without yellow markings.

TENTHREDINIDAE

Selandriinae

Selandriini

Brachythops flavens (Klug)

Selandridea vanduzeei Rohwer, 1911, **syn. n.**

Circumboreal.

Carex.

‡ *Brachythops wüstnei* (Konow)

Central and Northern Europe. Canada, Manitoba, Churchill, 5 ♂, 12–13.vi.1952 (*J. G. Chillcott*). 1 ♂ 29.vi.1956 (*R. B. Benson*).

? Circumboreal.

Carex.

Aneugmenini

* *Aneugmenus padi* (L.), ♀

Selandria urbis Ross.

Europe, North Africa, Asia Minor and Transcaucasia, introduced and widespread in Canada.

Pteridophyta.

Heptamelini

‡ *Heptamelus ochroleucus* (Stephens)

North Eurasia and British Columbia, Squamish, Diamond Head Trail, 3,300 ft., 1 ♀, 5.viii.1953 (*Edith Mason*) (Ottawa).

Pteridophyta.

Dolerini

Loderus eversmanni (Kirby)

Represented by subsp. *acidus* MacGillivray in North America, by subsp. *obscurus* Marlatt in Japan, and typical subspecies in Europe.

Circumboreal.

Equisetum.

Loderus pratorum (Fallén)

Represented by subsp. *albifrons* Norton in North America and East Asia, and typical subspecies in Europe.

Circumboreal.

Equisetum.

Loderus vestigialis (Klug)

Represented by subsp. *apricus* Norton in North America, subsp. *insulicula* Rohwer in Japan, and typical subspecies in Europe.

Circumboreal.

Equisetum.

Loderus genucinctus (Zaddach)

Represented by subsp. *napaeus* MacGillivray in North America and typical subspecies in Europe.

Circumboreal.

Equisetum.

Dolerus yukonensis Norton

Full synonymy in Benson, 1956 : 58.

Circumboreal.

Equisetum.

Dolerus gessneri André

Represented by subsp. *konowi* MacGillivray in Pacific North America and Siberia, subsp. *labiosus* Konow in North Europe and Siberia, and the typical subsp. in Western Europe.

Full synonymy in Benson, 1956 : 59.

Equisetum.

Dolerus subfasciatus Smith

Dolerus picinus rhodogaster Zhelochovtsev 1935 : 79, **syn. n.**
Dolerus pseudoanticus Malaise 1931 : 14–15, **syn. n.**

This species is represented by subsp. *neoaprilis* MacGillivray in N. America and the typical subspecies in Japan.

Equisetum.

Dolerus pratensis (L.)

Dolerus frisoni Ross.

North and Central Europe to East Siberia. Alberta, Manitoba and Illinois in North America.

? Circumboreal.

Equisetum.

Dolerus elderi Kincaid

Circumboreal : North Europe to East Siberia and mountains of Central Asia from Mongolia to Turkestan, North America from Alaska and the Cordilleras to the Atlantic coast.

Equisetum.

Dolerus similis Norton

Transcontinental boreal North American with melanic races (subsp. *nicaeus* MacGillivray) in the Pacific area, extends into East Asia to Japan (subsp. *japonicus* Kirby with entirely black males, but normal red-banded females). This species is very closely similar to the widespread palaearctic *D. germanicus* (Fabricius) (Benson, 1952 : 67, 73–74, figs. 185 and 220) which, however, has a deeply excised clypeus in front. The two are nowhere sympatric as *D. germanicus* does not reach Japan, and they may be conspecific.

Equisetum.

† *Dolerus asper* Zaddach

Dolerus asper Zaddach ; Benson, 1952 : 70, 77, figs. 175, 194, 207, 210 and 235.
Dolerus tectus MacGillivray **syn. n.**

Europe to East Siberia and, in America, recorded from Connecticut, Massachusetts, Michigan and South Dakota.

Cyperaceae and Gramineae.

Dolerus nitens Zaddach, ♀

Dolerus wanda Ross ♀.
Dolerus nitens Zaddach ; Benson, 1952 : 70, 76, figs. 174, 196, 205, 209 and 237.

North and Central Europe, New York, Ohio and Illinois in North America. The American race is obligatorily parthenogenetic like the high-alpine Swiss race and may prove to represent a different species for which the name *wanda* is available.

Tenthredininae

Heterarthrini

* *Heterarthrus nemoratus* (Fallén)

Europe, introduced to Nova Scotia about 1908 and now spread over most of eastern North America.

Betula.

Empriini

*** *Monostegia abdominalis*** (Fabricius) ♀

Europe to Asia Minor, Caucasus and Siberia, also eastern North America where it was probably introduced.

Primulaceae (*Anagallis*, *Lysimachia* and *Glaux*).

‡ *Empria candidata* (Fallén)

Central and North Europe to East Siberia and across North Canada from Yukon to Quebec. Yukon, Dawson, 1 ♀, 28.vi.1949 (*W. W. Judd*); North West Territory, Mackenzie Delta, Reindeer Depot, 3 ♀, 28.vi.1948 (*J. R. Vockeroth*); Salmita Mines, 64° 06′ N., 111° 15′ W. 1 ♀, 4.vii.1953 (*J. G. Chillcott*); Alberta, Banff, 1 ♀, 25.v.1922 (*C. B. D. Garrett*); Manitoba, Gilan, 1 ♀, 18.vi.1950 (*W. J. Brown*); Quebec, Pt. Chimo, 1 ♀, 16.vi.1948 (*H. M. Smith*).

Betula.

Ametastegia equiseti (Fallén)

Circumboreal.

Polygonaceae (*Rumex* spp.), Chenopodiaceae (*Chenopodium*) and Lythraceae.

Ametastegia glabrata (Fallén)

Circumboreal.

Polygonaceae and Chenopodiaceae.

Ametastegia pallipes (Spinola) ♀

Circumboreal.

Viola.

Ametastegia tener (Fallén)

Circumboreal.

Rumex.

Allantini

Allantus cinctus (L.)

Circumboreal.

Rosa.

*** *Allantus basalis*** (Klug)

Europe and Siberia, introduced into eastern North America.

Rosa.

Blennocampini

*** *Ardis sulcata*** (Cameron)

Europe, introduced into Washington.

Rosa.

Monophadnoides geniculatus (Hartig)

Circumboreal.
Rubus.

* ***Halidamia affinis*** (Fallén) ♀

Europe, introduced into New York.
Galium aparine L. and *G. mollugo* L.

* ***Stethomostus fuliginosus*** (Schrank)

Europe to Caucasus and also Japan, introduced into eastern North America (Massachusetts and New York).
Ranunculus.

Eutomostethus ephippium (Panzer) ♀

Europe, North Africa, Asia Minor, Caucasus, Transcaucasia, Himalayas, Siberia and North America.
Gramineae.

Eutomostethus luteiventris (Klug) ♀

Europe, Transcaucasia and North America.
Juncus and Gramineae.

† ***Monophadnus pallescens*** (Gmelin)

Monophadnus aequalis MacGillivray **syn. n,**

Europe, Siberia and eastern North America.
Ranunculus.

Caliroini

* ***Endelomyia aethiops*** (Fabricius)

Europe to Caucasus, introduced into North America where it is now widespread.
Rosa.

* ***Caliroa cerasi*** (L.), ♀

Throughout temperate Eurasia, probably introduced into North America now established also in South America, South Africa, Tasmania and New Zealand.
Rosaceous trees, especially cultivated *Pyrus* and *Prunus*.

Fenusini

† ***Messa wüstnei*** (Konow)

Messa alaskana (Kincaid).
Messa wüstnei (Konow) ; Benson, 1959 : 90.

Boreal and arctic Eurasia and North America.
Salix.

†* ***Profenusa thomsoni*** (Konow), ♀

Profenusa alumna MacGillivray.
Profenusa thomsoni (Konow) ; Benson, 1959 : 91.

Temperate Europe and Japan, introduced into North America where it is now widespread.
Betula.

* ***Fenusa dohrnii*** (Tischbein), ♀

Eurasia and North America, introduced into South Africa.
Alnus.

* ***F. pusilla*** (Lepeletier)

Eurasia and North America whither it has probably been introduced.
Betula.

* ***Kaliofenusa ulmi*** (Sundewall), ♀

Europe, introduced into eastern North America.
Ulmus.

Eriocampini

* ***Eriocampa ovata*** (L.), ♀

Europe, introduced into British Columbia.
Alnus.

Tenthredinini

Rhogogaster viridis (L.)

Circumboreal.
Alnus, Betula etc.

Tenthredo olivacea Klug.

Boreal Eurasia and Alaska.

† ***Tenthredo colon*** Klug.

Tenthredo eburneifrons Kirby **syn. n.**
Tenthredo nigricollis Kirby **syn. n.**
Tenthredo jocosa Provancher **syn. n.**
Tenthredo livida L.; Ross in Muesebeck, Krombein & Townes. nec L.

Europe, Asia Minor, Armenia, Siberia ; and Ontario, Quebec and Labrador in North America.
Polyphagous.

† ***Tenthredo atra*** L.

It would seem that *T. leucostoma* Kirby of eastern North America and other forms in the same species-group are geographical races of *T. atra*, which is widespread in Eurasia from north-western Europe to East Siberia.
Circumboreal.

† ***Tenthredo devia*** (Konow)

Tenthredo heraclei Kincaid.
Tenthredo alaskana Enslin.
Tenthredo devia (Konow) ; Benson, 1959 : 94, 100 and fig. 8.

Lapland, North Russia, North Siberia to Kamtchatka and Japan, Aleutian Islands to Popof Island, Alaska.

Macrophyini

Pachyprotasis rapae (L.)

Europe to Caucasus, Siberia, North China and transcontinental Canada and north United States.

Antirrhinum, Betonica, Scrophularia, Solidago and *Fraxinus.*

* ***Macrophya punctumalbum*** (L.) ♀

Macrophya erythropa Schrank.

Europe to Caucasus, introduced into Ontario.

Fraxinus and *Ligustrum.*

Nematinae

Cladiini

Priophorus morio (Lepeletier)

Priophorus brullei Dahlbom ; Benson, 1958 : 142, figs. 352 and 358.

Circumboreal. Europe to Caucasus, Japan and North America, introduced into New Zealand and Tasmania.

Rubus.

Priophorus pallipes (Lepeletier)

Priophorus pallipes (Lepeletier) ; Benson, 1958 : 143, figs. 351, 359 and 360.

? Circumboreal. Europe to Caucasus and Transcaucasia, Siberia, Japan and North America.

Rosaceae (such as *Crataegus, Fragaria, Laurus, Prunus* and *Pyrus*) and also *Betula.*

* ***Trichiocampus viminalis*** (Fallén)

Trichiocampus viminalis (Fallén) ; Benson, 1958 : 143, fig. 355.

Europe and North Asia, introduced to both west and east coasts of North America.

Populus and sometimes *Salix.*

Cladius difformis (Panzer)

Circumboreal.

Rosaceae.

Nematini

* *Hoplocampa testudinea* (Klug)

Europe to Caucasus, introduced into Western Canada and New York.
Malus pumila Mill.

Hemichroa crocea (Geoffroy)

Circumboreal.
Alnus.

* *Pristiphora abbreviata* (Hartig) ♀

Pristiphora californica Marlatt.

Central and southern Europe, introduced into California.
Pyrus communis L.

* *Pristiphora geniculata* (Hartig)

Europe to Eastern Siberia, introduced into east of North America.
Sorbus.

Pristiphora pallipes Lepeletier ♀

Pristiphora rufipes Lepeletier.

Circumboreal.
Ribes rubrum L., *R. uva-crispa* L., etc.

Pristiphora quercus (Hartig)

Pristiphora idiota Norton.

Circumboreal.
Vaccinium and *Betula*.

‡ *Pristiphora staudingeri* (Ruthe)

Pristiphora staudingeri (Ruthe); Lindqvist, 1953 : 220–222, figs. 2 and 6; Benson 1958 : 167, figs. 461, 467.

Circumpolar : arctic-alpine in Europe, northern Siberia to Kamtchatka and Canada Manitoba, Churchill, vi.1956, (*R. B. B.*).
Salix.

‡ *Pristiphora leucostoma* (Lindqvist) **comb. nov.**

Lygaeophora leucostoma Lindqvist, 1952 : 108–109, figs. 42 and 61.

? Circumpolar.

I collected samples of this species in Swedish Lapland in 1954 and in Canada, Manitoba, Churchill, vi–vii.1956. It was also found in the North-west Territory, Mackenzie Delta, Reindeer Depot, 6.vii.1948 (*J. R. Vockeroth*).
Salix.

‡ *Pristiphora reuteri* (Lindqvist) **comb. nov.**

Lygaeophora arcticola (Enslin) ; Lindqvist, 1952 : 110–111, figs. 23, 44, and 62. nec Enslin.
Lygaeonematus (*Lygaeophora*) *reuteri* Lindqvist, 1960.

This arctic Eurasian species (N. Europe to Kamtchatka) is probably circumpolar as I found it in Canada, Manitoba, Churchill, vi–vii.1956 (*R. B. B.*).

Salix.

‡ *Pristiphora pseudocoactula* Lindqvist

Lygaeonematus pseudocoactulus Lindqvist, 1952 : 115, figs. 29 and 50.

Probably circumpolar : Canada, Manitoba, Churchill, 1♀, 3.vii.1956 (*R. B. B.*).

† *Pristiphora coactula* (Ruthe)

Pristiphora winnipeg (Norton). **syn. n.**
Lygaeotus coactulus (Ruthe) ; Lindqvist 1952 : 84–87, figs. 1, 31 and 52.

Vaccinium.

Circumpolar and arctic-alpine in Europe. This and the two following species are kept distinct with some diffidence. The slight differences in the genitalia given by Lindqvist are not reliable. The ranges are identical. They are probably forms of one species.

‡ *Pristiphora borea* (Konow)

Lygaeonematus boreus Konow, 1904 : 253.
Lygaeotus boreus (Konow) ; Lindqvist 1952 : 93–96, figs. 6, 33 and 54.
Pristiphora borea (Konow) ; Benson, 1958 : 171, figs. 459, 464 and 473.

Likewise circumpolar and arctic-alpine in Europe. In Canada, Manitoba, Churchill, it was common in June–July 1956 with the preceding and succeeding species. It was also found in North-west Territory, Mackenzie River, Reindeer Depot, 1948 (*J. R. Vockeroth*), Salmita Mines 64° 00′ N., 11° 15′ W., 1953 (*J. G. Chillcott*), and Padlei, 1950 (*R. A. Henniger*) ; Quebec at Bradore Bay, 1929 (*W. J. Brown*), and Great Whale River, 1949 (*J. R. Vockeroth*) ; and Labrador, Goss Bay, 1948 (*W. E. Becket*).

† *Pristiphora lativentris* (Thomson)

Pristiphora bucoda Kincaid.
Lygaeotus lativentris (Thomson) ; Lindqvist, 1952 : 88–90, figs. 2–4, 32 and 53.
Pristiphora lativentris (Thomson) ; Benson, 1958 : 169, figs. 465 and 472.

Likewise circumpolar and arctic-alpine in Europe. In Canada, Manitoba, Churchill, it occurred with the two preceding species in June–July 1956 and was also found in North-west Territory, Mackenzie River, Reindeer Depot, 1948 (*J. R. Vockeroth*).

Pristiphora mollis (Hartig)

Pristiphora mollis (Hartig) ; Benson, 1958 : 169, figs. 457, 462 and 468.

Circumboreal.

Vaccinium.

Pristiphora erichsonii (Hartig)

Circumboreal.
Larix.

Amauronematus amentorum (Förster)

Amauronematus suavis (Ruthe).
Pontopristia kamtchatica Malaise, 1931 : 53–54, fig. 24*a*.
Amauronematus amentorum (Förster) ; Benson, 1958 : 182, figs. 514, 515 and 533 ; Benson, 1959 (b) : 102–3, fig. 1.

Circumboreal including North Greenland, Brønlund Fjord, Independence Fjord, Klaresø, 82° N., 31° E., 1 ♂, 24.vi.1949 Danish Pearyland Exp., (*P. Johnson*) ; East Greenland, c. 76° 46′ N., 1 ♀, beginning of vii.1908 ; West Greenland, Jakobshavn c. 69° N., 1 ♀, 28.vi.1951 (*C. Vibe*).

‡ *Amauronematus itelmena* (Malaise)

Pontopristia itelmena, Malaise, 1931 : 54, fig. 24*b*.

Besides Kamtchatka this species also occurs in Canada, Manitoba, Churchill, where I collected 1 ♀, 24.vi.1956, on *Salix alexensis* (Anderss) Cov.

‡ *Amauronematus microphyes* (Förster)

Pontopristia romani Malaise, 1921 : 14, fig. 46.
Pontopristia nana Lindqvist, 1949 : 68–69, fig. 8.

Besides Europe this species also occurs in Canada, Ontario, Ottawa, where I caught 1 ♀, 7.v.1956.
Salix.

‡ *Amauronematus groenlandicus* Malaise

Amauronematus groenlandicus Malaise, 1933 : 3–4, figs. 1*a–c*.
A. carbonarius Hellén, 1951 : 71–2, **syn. n.**
A. carbonarius Hellén ; Lindqvist, 1959 : 7–8 figs. 13 and 14.

This high-arctic species is circumboreal. It occurs on mountains in Norway and Swedish Lapland (I found it between 2,000 and 3,000 ft. near Låktatjåkko and Björkliden in vi.1954). Lindqvist records it also from Finland and Novaja Zemlja. I am indebted to Dr. B. Petersen (Copenhagen) for lending me 2 ♀ (from Greenland) that he had compared with the type of *groenlandicus*. The Greenland localities are as follows : Scoresby Sund, 19.vii.1956 and Mestersvig, King Oscars Fjord, 27.v.1953 (*C. Vibe*), and the type locality was Wollaston Foreland. These places are all near together on the mid-east coast of Greenland between 70° and 75° N.

In the Canadian national collections at Ottawa there are 6 ♂ 11 ♀ from : N.W. Territory : Spence Bay, Coral Harbour in Southampton Island and Chesterfield in the North Hudson Bay region and also from Cambridge Bay (Victoria Island), Coppermine and Norman Wells ; and from Alaska, Sleese Bay. All these specimens were collected by the staff from Ottawa in 1950, 1951 and 1952.
? *Salix.*

This species is very closely related to *A. hyperboreus* (Thomson, 1871) and is probably only a high-arctic form of this species, but in all the specimens before me the

third antennal segment in ♀ *groenlandicus* is about as long as the shortest eye measure and in ♀ *hyperboreus* it is about ×1½ this length. Unfortunately the comparative measurements of antennal segments are not altogether reliable, nor are minute differences in saw tooth and penis valves in arctic insects as used by Lindqvist (1959).*

‡ *Amauronematus hebes* Konow

Amauronematus hebes Konow, 1907 : 17–18 (footnote).
Amauronematus pristiphorinus Malaise, 1931 : 2 and fig. 29.
Amauronematus hebes Konow ; Lindqvist, 1941 : 71.

This species is probably circumpolar as it was found in Canada, North-west Territory ; Chesterfield, 15.vii.1950 (*J. G. Chillcott*) ; and Mackenzie Delta, Reindeer Depot, 6.vi.1948 (*J. R. Vockeroth*) ; and Coppermine, vi–vii.1951 (*S. D. Hicks*).

‡ *Amauronematus hulteni* Lindqvist

Amauronematus variabilis var. *hulteni* Malaise, 1931 : 43.
Amauronematus hulteni Lindqvist, 1941 (1) : 62–63.

This species was originally described as one of several varieties of *A. variabilis* Malaise in Kamtchatka and has not been recorded elsewhere. In Canada it has been found in : Yukon Territory, Rampart House, 28.v.1951 (*J. E. H. Martin*) ; North-west Territory, Norman Wells, 16–18.v.1953 (*C. D. Bird*) and Chesterfield 15.vii.1950 (*J. G. Chillcott*) ; and Manitoba, Churchill, in vii.1956 (*R. B. B.*). The species is very close to *A. helleni* Lindqvist but has a smooth unpunctured scutellum.

‡ *Amauronematus helleni* Lindqvist

Amauronematus helleni Lindqvist, 1941 (2) : 65–66.

This species was previously known only from Finland and North Sweden. I have seen it from Canada as follows : North-west Territory : Mackenzie River, Reindeer Depot, 25.vi.1948 (*W. J. Brown*), 6.vii.1948 (*J. R. Vockeroth*) ; Norman Wells, 3.vii.1949 (*W. R. M. Mason*) ; Salmita Mines, 64° 5′ N., 111° 15′ W., 22.vi.1953 (*J. G. Chillcott*) ; Bathurst Inlet, 30.vi.1951 (*W. I. Campbell*) ; Victoria Island, Cambridge Bay, 1.vi.1950 (*E. H. N. Smith*) ; Muskox Lake, 64° 45′ N., 108° 10′, 12.vii.1953 (*J. G. Chilcott*) ; Repulse Bay, 26.vi.1950 (*J. E. H. Martin*) ; Baffin Island, Frobisher Bay, 1 ♀, 24.vi.1948 (*T. N. Freeman*) ; Chesterfield, 7–12.vii.1950 (*J. G. Chillcott* and *J. R. Vockeroth*) ; Padlei, 30.vi–19.vii.1950 (*R. A. Henniger*) ; Quoich River, 65° N., 94° 30′ W., 22.vii.1950 (*J. G. Chillcott*). Manitoba : Churchill, 12.vi.1950 (*H. J. Teskey*), 3.vi.1952 (*J. G. Chillcott*), 22.vi–4.vii.1956 (*R. B. B.*). Quebec : Great Whale River, 20.vi.1949 (*J. R. Vockeroth*).

This species is very close to *A. arcticola* (Dalla Torre) from which it differs in that the saw teeth are not produced at their bases. Furthermore the head and thorax are usually far more extensively coloured with yellow.

* The synonymy of *Amauronematus hyperboreus* (Thomson, 1871) includes at least : *Amauronematus poppii* Konow, 1904, **syn. n.** ; *A. coracinus* Lindqvist, 1959 (1) : 6–7, figs. 9 and 10, **syn. n.** and *A. enslini* Lindqvist, 1959 (1) : 8–9, figs. 13 and 14, **syn. n.**, and probably also *A. anthracinus* Lindqvist, 1959 (1) : 11, figs. 17 and 18, *A. macrophthalmus* Lindqvist, 1959 (1) : 13–14, figs. 21 and 22, and *A. obesus* Lindqvist, 1959 (1) : 11–12, figs. 19 and 20.

‡ *Amauronematus arcticola* (Dalla Torre)

Nematus arcticus Thomson, 1871, nec Holmgren, 1869.
Amauronematus arcticola Enslin, 1915 : 389 nec Dalla Torre, 1894 ; Benson, 1958 : 185, 189; figs. 516, 551, 558 and 577.

Previously recorded from arctic and alpine Europe and Kamtchatka ; was found in Alaska : Nome, vi.1951 (*D. P. Williams*) and Canada : North-west Territory, Coppermine, 12.vi–10.vii.1951 (*S. D. Hicks*) and Southampton Island, Coral Harbour, 9.vii.1948 (*G. E. Shewell*)).

Salix.

‡ *Amauronematus tillbergi* Malaise

Amauronematus tillbergi Malaise, 1920 : 125, fig. 26.
A. tillbergi Malaise ; Benson, 1958 : 184, 187 and fig. 551.

Previously recorded from northern and arctic Europe and Kamtchatka in East Asia ; was found in Alaska : Nome : 16.vi.1951 (*D. P. Williams*) and Canada, North-west Territory, Chesterfield, 25.vii.1950 (*J. R. Vockeroth*).

Salix.

‡ *Amauronematus polaris* (Holmgren)

Amauronematus polaris (Holmgren) ; Lindqvist, 1944 : 14.

For a full synonymy of this very variable species see Benson, 1961.

Circumboreal arctic species, also alpine in Europe and West Canada. Holmgren's type was from Novaja Zemlja. North American records : Alaska, Steese Highway, Mile 110, 1 ♀, 31.vi.1951 (*Mason and McGillis*) ; Alberta, near Lake Louise, c. 7,000 ft., 2 ♀, 22–25.vi.1956 (*Joyce Benson*). North-west Territory, Salmita Mines, 64° 50′ N., 11° 15′ W., 1 ♀, 22.vi.1953 (*J. G. Chillcott*) ; Reindeer Depot, Mackenzie River, 1 ♀, 28.vi.1948 (*J. R. Vockeroth*) ; Southampton Island, Coral Harbour, 1 ♀, 26.vi.1952 (*P. Ehrlich*).

Salix.

‡ *Amauronematus semilacteus* (Zaddach)

Amauronematus semilacteus (Zaddach) ; Benson, 1958 : 187.

In addition to its occurrence in North and Central Europe, 1 ♀ was collected in Canada, British Columbia, Vernon, 24.v.1918 (*W. Downes*).

Salix.

‡ *Amauronematus variator* (Ruthe) ♀

Amauronematus variator (Ruthe) ; Lindqvist, 1959 : 2, figs. 5 and 6.

This arctic-alpine species of Eurasia is evidently circumboreal with the following nearctic records. Alaska : Nome vi.1951 (*D. P. Williams*) ; Richard Highway, Mile 213, vi.1951 (*J. R. McGillis*) ; Yukon Territory, Aklavik, vi.1953 (*C. B. Bird*) ; North-west Territory : Norman Wells, vi.1949 (*W. R. M. Mason*) ; Southampton Isle, Coral Harbour, vii.1948. (*G. E. Shewell*) ; Padlei, vi–vii.1950 (*R. A. Henniger*). Manitoba, Churchill, vii.1950 (*H. J. Teakey*) and vi.1952 (*J. G. Chillcott*).

It is curious that this widespreading species should be apparently entirely parthenogenetic, while its close relative *A. godmani* Benson (1955 : 104–105, figs. 5–9) with normal males, is restricted, so far as is known, to Switzerland and north-west Scotland.

Salix.

‡ *Amauronematus sagmarius* Konow, ♀

Amauronematus viduatinus Malaise, 1931 : 40–41, fig. 11*c*.
Amauronematus sagmarius Konow ; Benson, 1958 : 179, figs. 536 and 540.

Circumboreal species. Normally yellow with only the following parts black : antennae above, anchor on mesoscutellum, metascutellum and dorsum of abdomen.

North American specimens as follows : North-west Territory : Mackenzie River, Reindeer Forest, 1 ♀, 18.vi.1951 (*D. P. Williams*) ; Rampart House, 3 ♀, v–vi.1951 (*J. E. H. Martin*) ; Norman Wells, v.1953 (*C. B. Bird*) ; Southampton Isle, Coral Harbour, vi.1952 (*P. B. Ehrlich*). Alaska : Nome, 1 ♀, 16.vi.1951 (*D. P. Williams*). Alberta ; Lake Louise, 2 ♀, 25–27.vi.1956 (*Joyce Benson*). Manitoba, Churchill, 5 ♀, 24.vi–4.vii.1956 (*R. B. B.*). 1 ♀, 10.vi.1952 (*J. G. Chillcott*). Ontario, Ottawa, 11 ♀, 1.v–22.v.1956 (*R. B. B.*). Most of these specimens are much darker than in the typical form and some even have the thorax entirely black and the head with only the temples obscurely brown.

Salix.

‡ *Amauronematus pravus* Konow

Of this species, previously recorded only from North Eurasia, one single example has been found in North America : Alaska, Donnelly Dorne, Richard Highway, Mile 719, 1 ♀, 7.vi.1951 (*W. R. M. Mason*).

Salix.

‡ *Amauronematus leptocephalus* (Thomson)

Amauronematus leptocephalus (Thomson) ; Malaise, 1920 : 121–122, fig. 21.

This arctic Eurasian species has been found in Canada, Manitoba : Churchill, 1 ♀, 17.vi.1952 (*J. G. Chillcott*) and Mile 505, Hudson Bay Railway, 1 ♀, 3.vi.1952 (*J. G. Chillcott*).

† *Amauronematus fallax* (Lepeletier)

Nematus trifurcus Kirby, **syn. n.**
Pontania quadrifasciata MacGillivray, **syn. n.**
Amauronematus nuorbinjargi Saarinen, 1949 (2) : 57–62, figs. 1–5, **syn. n.**
Amauronematus hartigi Saarinen, 1950 (1) : 20–22, figs. 4–6.
Amauronematus striatus Hartig ; Saarinen, 1950 : 22–24, figs. 1–3.
Amauronematus glacialis Saarinen, 1950 (*a*) : 45, figs. 1, 7 and 13, **syn. n.**
Amauronematus amicula Saarinen, 1950 (*a*) : 47, figs. 2, 8, and 14, **syn. n.**
Amauronematus subnitens Saarinen, 1950 (*a*) : 49, figs. 3, 9 and 15, **syn. n.**
Amauronematus septentrionalis Saarinen, 1950 (*a*) : 54, figs. 4, 10 and 16, **syn. n.**
Amauronematus festivus Saarinen, 1950 (*a*) : 58, figs. 5, 11 and 17, **syn. n.**
Amauronematus propinquus Saarinen, 1950 (*a*) : 60, figs. 6, 12 and 18, **syn. n.**
Amauronematus fallax (Lepeletier) ; Benson, 1958 : 182, 189, fig. 503.

A common and very variable circumboreal sawfly, subarctic-subalpine in Europe. I have collected it in Ontario and Manitoba, Canada and have seen good series of it

at Urbana, Illinois, and Ottawa, Ontario, from the following North American localities : Alaska (Nome and Skagway), North-west Territory (Chesterfield and Eskimo Point), British Columbia (Trinity Valley), Alberta (Wabrunum), Yukon Territory (Little Salmon and Whitehorse), Manitoba (Avenue, Birtle and Churchill) Ontario (Ottawa and St. Martin's Falls, Albany River), Nova Scotia (Kentville).

Structurally *A. fallax* has not been distinguished from *A. histrio* (for differences between the two species see Benson, 1958 : figs. 502–503). Furthermore, it is not always easy to distinguish between *A. fallax* (on *Salix*) and *A. schlueteri* Enslin, 1915 : 405 (=*A. uliginosae* Malaise, 1920 : 122–123, fig. 29, *A. lundbohmi* Malaise, 1920 : 119, fig. 19, and *A. squamosus* Lindqvist, 1959 (1) : 14, **syn. n.**) (on *Vaccinium*) : *A. schlueteri* is usually smaller and the sawsheath is shorter than the basal plate, and in dorsal view is only about as long as its greatest breadth. In *fallax* on the other hand the sawsheath is longer than the basal plate and in dorsal view more than $\times 1\frac{1}{2}$ its greatest width.

Of the North-American arctic *A. stordalensis* (Strand, 1905 : 7) (= *A. marginifer* (Strand, 1905 : 8) **syn. n.**, *A. cogitatus* MacGillivray **syn. n.**, and *A. varianus* MacGillivray **syn. n.**) I have seen Strand's types from S. Ellesmere Isle (through the kindness of Dr. Natvig of Oslo) and specimens from Baffin Land (*V. C. Wynne Edwards*) and, at Ottawa, from Alaska (MacGillivray types), Repulse and Cambridge Bay (North-west Territory). It differs from *A. fallax* in its ovipositor being shorter than the hind femur (in *fallax* at least as long as femur and 2nd trochanter together), in its malar space (♂ and ♀) being about $\times 1\frac{1}{2}$ as long as distance between the antennal sockets (in *fallax* the malar space is only about equal to the distance between the antennal sockets) and in its almost entirely black colour (*fallax* often ± marked with pale colour).

The European alpine *A. opacipleuris* Konow is closely related to *A. stordalensis*, differing in that its head is more strongly contracted behind the eyes.

† *Amauronematus histrio* (Lepeletier)

Amauronematus luteotergum (Norton), **syn. n.**
Amauronematus histrio (Lepeletier) ; Benson, 1958 : 178, 182, 189, figs. 502, 505, 524, 563 and 566

Another circumboreal species but of more temperate regions giving place northwards to *A. fallax*. According to Ross, 1951 : 52, it is an eastern species in North America, occurring westwards only as far as Illinois. I have, however, collected it at Churchill, Manitoba, and in the British Museum is a specimen from Colorado (*T. D. A. Cockerell*). Ross also gives *Alnus* as the foodplant of this species on the authority of Dyar. The specimens I collected at Ottawa and Churchill were definitely associated with *Salix* and far away from any *Alnus*.

† *Amauronematus neglectus* (W. F. Kirby)

Amauronematus intermedius Malaise, 1931 : 39–40, **syn. n.** ; Saarinen, 1949 (1) : 78–81, figs. 2, 5, 8–10, 16–18 and 24.

Circumboreal species : in Europe only known in Lapland. East Siberia (*Malaise*, 1931) ; British Columbia, Salmon Arm, 1923 (*C. R. Buckell*) ; Colorado, 1891 (*T. D. A.*

Cockerell) ; Yukon, Rampart House, vi.1951 (*J. E. H. Martin*) ; North-west Territory, Norman Wells, v.1953, (*D. Bird*) ; Manitoba, Churchill, vi.1952–1956 (*J. G. Chillcott* and *R. B. B.*) ; Ontario, St. Martin's Falls, Albany River, before 1844, types of *Nematus neglectus* ; and Ottawa v.1956, (*R. B. B.*) ; Quebec, Fort Chimo, vii.1948, (*R. H. MacLeod*) ; Illinois, Zyon, v.1956 (*J. E.* and *R. B. B.*) ; Havana, vi.1912 (*A. W. J. Pomeroy*).

This species is closely related to the European *A. mundus* Konow, but in the ♀ shows a greater range of colour pattern ; abdomen above entirely yellow to entirely black except for the apex, mesonotum yellow with ± black flecks on the lobes and mesopleura yellow with or without mesosternal fleck to entirely black. (*A. mundus* always has at least three or four basal tergites marked with black.) The differences between the saws are figured by Saarinen, 1949 : figs. 8–11 and 16–19.

Salix.

‡ *Amauronematus longicauda* Hellén

Nematus (*Amauronematus*) *longicauda* Hellén, 1948 : 113 ; Saarinen, 1949 (1) : 81–82, figs. 12, 22 and 26.

Saarinen recorded this species only from Lapland. I have seen North American specimens as follows : British Columbia, Vancouver, 1 ♀, iv.1931 (*H. H. Ross*) and Agassiz, 1 ♀, iv.1932 (*R. Glendenning*) ; Manitoba, Churchill, 1 ♀, vi.1952 (*J. G. Chillcott*).

† *Amauronematus abnormis* (Holmgren)

Amauronematus tolli Konow, 1907 : 20–21.
Amauronematus aulatus MacGillivray, **syn. n.**
Amauronematus abnormis (Holmgren) ; Benson, 1958 : 179, figs. 500, 501, 509, 527, 532, 557 and 569.

Circumpolar, high arctic and alpine. Lapland, Scotland, Switzerland, Novaja Zemlja, Lena River, New Siberian Islands, North Behring Sound, North Alaska (Barter and St. Paul Islands), Baffin Island (Marble Canyon) and North-west Territory (Chesterfield).

This species is apparently closely related to the preceding *A. longicauda* Hellén. The curved spine on the penis valve (Benson, 1958, fig. 569), however, distinguishes the male from that of any other species. In the female (Benson, 1958, fig. 501) the short wings (shorter than abdomen) with reduced venation and correlated flattening of mesonotal lobes should distinguish the species apart from the differences in the shape of the saw tooth. The short ovipositor (shorter than hind tibia) will also distinguish it from *A. longicauda* and all other members of the *longiserra*-group (in all others of which the ovipositor is as long as or longer than the hind tibia).

The development of the wings in the female varies greatly between individuals and correlated with this the development of the flight muscles in the mesonotum. The specimen I found in Switzerland in 1959 had almost normal wings and mesonotum ; and it seems probable that females with quite normal wings might occur.

† *Amauronematus leucolaenus* (Zaddach)

Pontania unga Kincaid, **syn. n.**
Amauronematus saarineni Lindqvist, 1945 : 106, fig. 5, **syn. n.**

This common circumboreal species I have seen from the following localities in North America : Alaska, Popof Island, vii.1899 (*T. Kincaid*) ; Yukon Territory, Rampart House, v.1951 (*J. E. H. Martin*). North-west Territory, Coppermine, vi.1951 (*S. D. Hicks*) ; Norman Wells, v.1953 (*C. D. Bird*) ; Spence Bay, vi.1951 (*A. E. R. Downes*) ; Alberta, Lake Agnes near Lake Louise, 6–700 ft., vi.1956 (*J. E. Benson*). Saskatchewan, Saskatoon, v.1939 (*A. R. Brooks*). Manitoba, Churchill, vi.1952 (*J. G. Chillcott*) and iv.1941 (*O. Peck*) and Ottawa, v.1956 (*R. B. B.*).

† *Amauronematus viduatus* (Zetterstedt)

Amauronematus orbitalis Marlatt, **syn. n.**
Amauronematus viduatoides Lindqvist, 1959 (*b*) : 127–128, fig. 1, **syn. n.**

This very common European species is also circumboreal but is scarce in North America whence I have seen specimens from the following localities : Oregon (type of *orbitalis*). Saskatchewan, Saskatoon, v.1940 (*A. R. Brooks*) ; Ontario, Ottawa, v.1956 (*R. B. B.*).

‡ *Amauronematus nitidipleuris* Malaise

Amauronematus nitidipleuris Malaise, 1931 : 45 ; Lindqvist, 1945 : 105–106, fig. 4.

This high arctic circumpolar species described originally from Kamtchatka was later recorded from Europe by Lindqvist (1945 : 105, saw fig. 4). I have examined the following from Greenland, thanks to Dr. Børge Petersen (Copenhagen) : East Greenland : Heklahavn, c. 70° N., 1 ♀, vi.1892 (*Deichmann*) ; Mestersvig, c. 72° N., 1 ♀ ; 17.v.1953, 1 ♀, 22.v.1953 (*C. Vibe*) ; North-west Greenland, Inuarfigssuak, Inglefieldland, c. 79° N., 1 ♀, 24.vi.1941 (*C. Vibe*). In Canada it has so far only been found in Manitoba, Churchill, vi.1952 (*J. G. Chillcott* and *P. R. Ehrlich*) and vi.1956 (*R. B. B.*).

† *Euura mucronata* (Hartig)

Euura insularis Kincaid, **syn. n.**

Circumboreal and one of the commonest sawflies in North-west Europe, but seems subarctic in North America : Alaska (*Kincaid*) ; Manitoba, Churchill (*R. B. B.*). This and the following species, which feed as larvae inside *Salix* buds, have saws with projecting marginal teeth (Benson, 1958, fig. 593). *E. mucronata* feeds on a great range of *Salix* species. Species whose larvae feed in petioles or stems have saws without projecting marginal teeth (Benson, 1958, fig. 592). *Euura orbitalis* Norton, 1862 from East Canada differs from *E. mucronata* in having pale hind orbits and temples, but may be no more than a geographical race.

‡ *Euura lanatae* Malaise

Euura lanatae Malaise, 1920 : 105, fig. 4.

This species is abundant in Lapland where, however, it is attached to *Salix lanata* L. (see preceeding species). At Churchill, Manitoba, I found the species on the closely related *Salix calcicola* Fern. and Wieg in vi–vii.1956, and my wife collected it in Alberta, Lake Louise, at about the same time.

† *Euura atra* (Jurine)

Euura nigra Provancher, **syn. n.**

This species was not uncommon about Ottawa, Ontario, in vi.1956, and there is a bred series in the Museum at Ottawa from Alberta, Brooks, v.1952. The type of *E. nigra* was from Quebec. The larvae of this species feed in stems of many of the narrow-leaved *Salix*, such as *repens* L., *viminalis* L., *fragilis* L. and *purpurea* L. For the saw see note under *E. mucronata* above.

‡ *Phyllocolpa coriacea* (Benson)

Phyllocolpa coriacea (Benson) ; Benson, 1960 (*a*) : 60.

This species, which is boreo-subalpine in Europe, I have found in north Scandinavia, north Britain and Switzerland, and my wife found it near Lake Louise, Alberta, in vi.1956. *Salix ? spp.* This genus *Phyllocolpa* (Benson, 1960 (*a*)) and the following genus *Pontania* were studied comprehensively by Benson, 1960.

† *Phyllocolpa excavata* (Marlatt)

Phyllocolpa excavata (Marlatt) ; Benson, 1960 (*a*) : 60.

For full synonymy of this species see Benson, 1960 : 380.

Another boreo-subalpine species, circumboreal in distribution, forming leaf edge rolls on *Salix pentandra* L. in Europe and presumably on this also where introduced into North America as well no doubt as on related species.

‡ *Phyllocolpa acutiserra* (Lindqvist)

Pontania acutiserra Lindqvist, 1949 : 66–68.
Phyllocolpa acutiserra (Lindqvist) ; Benson, 1960 (*a*) : 60.

This species, previously known from Lapland and Scotland, I found at Manitoba, Churchill, vi.1956.

† *Pontania crassipes* (Thomson)

The definition and synonymy of this species were discussed by Benson, 1960 and later in 1960 (*b*) : 179–180. It is a circumpolar arctic-alpine species very variable in structure and colour, and forming pea-shaped galls on the main vein usually mainly on the underside of a leaf of the following willows : *Salix reticulata* L., *S. herbacea* L., *S. polaris* Wheb., *S. arctica* Pall., *S. myrsinites* L., *S. lapponum* L., and *S. arbuscula* L.

‡ ***Pontania dolichura*** (Thomson)

The synonymy of this species was given by Benson, 1960. In Europe it is boreo-alpine and in Canada I found it at Manitoba, Churchill, in vi.1956. The known host range is : *Salix phylicifolia* L., *S. nigricans* Smith, *S. purpurea* L., and occasionally *S. arbuscula* L., *S. lapponum* L., *S. myrsinites* L., *S. lanata* L., *S. glabra* Scop., *S. incana* Schrank and *S. retusa* L. in Europe ; *S. sachalinensis* R. Schmidt. in Kamtchatka ; and *S. planifolia* Pursh. in Canada.

†* ***Pontania proxima*** (Lepeletier)

Messa hyalina Norton.

This species is common on *Salix fragilis* L. and *S. alba* L. in Europe and where these trees have been introduced into Canada.

Croesus varus (Villaret)

Alnus.

‡ ***Nematus crassus*** (Fallén)

This widespread Eurasian species was found in North-west Territory of Canada, Mackenzie River, Reindeer Depot, 1 ♀, 12.vii.1948.

Betula, Populus, Salix and *Rumex.*

‡ ***Nematus villosus*** Thomson

This arctic species previously known only from Spitzbergen and Lapland was found in North-west Territory of Canada, Chesterfield, 1 ♂, 15.vii.1950 (*J. G. Chillcott*) and Cambridge Bay, 1 ♂, 11.vii.1950 (*G. K. Sweetman*).

† ***Nematus reticulatus*** Holmgren

Pontania popofiana Kincaid, and *P. glinka* Kincaid.

This circumpolar arctic-alpine is extremely variable in structure and colour, and for full synonymy see Benson, 1961.

In addition to Kincaid's types I have also seen North American material from the following localities : Alaska, Pt. Barrow and Upper Colville River, vi–viii.1950 (*N. A. Weber*) ; Nome, 16.vi.1951 (*D. R. Whillans*) ; King Salmon, Naknek River, 10.viii.1952 (*J. B. Hartley*) ; North-west Territory, Salmita Mines, 64° 05′ N., 111° 15′ W., 22.vi–8.vii.1953 (*J. G. Chillcott*) ; Muskox Lake, 64° 45′ N., 108° 10′ W., 10–11.vii.1953 (*J. G. Chillcott*) ; Southampton Isle, Coral Harbour, 9.vii.1948 (*G. E. Shewell*) ; Manitoba, Churchill, 20.vi.1952 (*C. D. Bird*), and 7–11.vii.1956 (*R. B. B.*) ; Labrador, Hebron, 9.vii.1954 (*J. F. McAlpine*) ; New Hampshire, Mount Washington, Lake of the Clouds, 29.viii.1954 (*Becker, Munroe* and *Mason*).

Vaccinium.

Nematus ribesii (Scopoli)

Ribes.

* *Nematus tibialis* (Newman)

This species, native on *Robinia pseudacacia* L. in North America, was introduced with the tree to Europe.

‡ *Nematus jugicola* Thomson

I collected a series of this European boreo-subalpine species at Manitoba, Churchill, 4–11.vii.1956. The females have an almost entirely black abdomen as in the high-arctic forms of Europe.

Nematus oligospilus Förster

Nematus mendicus Walsh, **syn. n.**

‡ *Pachynematus parvilabris* (Thomson)

Pachynematus inopinatus Lindqvist, 1949 : 82–83, figs. 39–40, **syn. n.**
Pachynematus abstrusus Lindqvist, 1949 : 83–84, figs. 43–44, **syn. n.**

The two species described by Lindqvist on very slight characters were based on three specimens only, and are undoubtedly only forms of *P. parvilabris*.

A female collected on Ward Hunt Island (off the North coast of Grant Land, North-west Territory) 83° 05′ N., 74° 30′ W., at the end of July 1954 (*G. Hattersley-Smith*) must be the most northerly sawfly ever found (cf. *Amauronematus amentorum* at c. 82° 31′ N. in North-west Greenland). The specimen is not quite typical, the number of marginal teeth to the saw being reduced from 14 to 13, vein 2 rm in the forewing is missing and the front lobe of the mesonotum has lost its medial groove. Other Canadian specimens are as follows : North-west Territory ; Southampton Island, Coral Harbour, 6.vii.1948 (*G. E. Shewell*) ; Chesterfield, 13.vii–3.viii.1950 (*J. R. Vockeroth*) ; Repulse Bay, 29.vi.1950 (*J. E. H. Martin*).

In Greenland the species has been found at Marrait, Nugssuak, 1 ♀, 18.vi.1949 (*C. Vibe*). This locality is 70°–71° N., near the middle of the west coast.

The species is probably circumpolar.

† *Pachynematus obductus* (Hartig) ♀

Nematus palliventris (Cresson).

Gramineae.

† *Pachynematus vagus* (Fabricius) ♀

Nematus inconspicuus Kirby.
Pachynematus corticosus MacGillivray.

Carex and *Salix*.

‡ *Pachynematus rumicis* (L.)

Pachynematus rumicis (L.) ; Benson, 1958 : 234, figs. 775 and 798.

Circumboreal subarctic species reaching Iceland and in North America : Alaska, Cold Bay, 163° W., 1 ♀, vii.1952 (*W. R. Mason*), and Manitoba, Churchill, 1 ♀, 8.vii.1956 (R. B. B.).

Rumex.

This species is closely related to the following species :

‡ *Pachynematus freyi* Lindqvist

Pachynematus freyi Lindqvist, 1949 : 81–82, figs. 37–38.

This arctic species of Europe and Siberia reaches Canada : North-west Territory, Mackenzie, Reindeer Depot, 26–30.vi.1948 (*W. J. Brown* and *J. R. Vockeroth*), and Yukon Territory, Rampart House, 12.vii.1951 (*J. E. H. Martin*). This is closely related to the preceding species *P. rumicis* but is almost entirely black in colour and the saw has only 10 denticulated bands and 5–6 marginal teeth (11 and 9 in *rumicis*).

‡ *Pachynematus excisus* (C. G. Thomson)

This arctic European species has been found on the west coast of Greenland at Equilet-landet, at about 61° N., and at Grønne dal, Godthåb, and also at Sarqaq, Marrait, and Augpilagtoq between 70° and 73° N., 9–17.vii.1948–51 (*C. Vibe*). I am indebted to Dr. Børge Petersen (Copenhagen) for letting me see these specimens.

Pachynematus moerens (Foerster)

Pachynematus falonus Ross.

Gramineae.

Pachynematus clibrichellus (Cameron)

Carex.

† *Pachynematus extensicornis* (Norton)

Pachynematus foveolatus Konow, **syn. n.**
Pachynematus truncatus (Benson, 1948) ; Benson, 1958 : 237, 241, figs. 788 and 806.

Gramineae.

Pachynematus kirbyi (Dahlbom)

Pachynematus diaphanus Eversmann.
Pachynematus kirbyi (Dahlbom) ; Lindqvist, 1956 : 1 ; Benson, 1958 ; 237, 241, figs. 787 and 805.

Carex.

Pachynematus smithiae Ross

Probably circumboreal arctic-alpine. It was originally described from Mount Washington, New Hampshire, but I have collected specimens in Lapland, in the Scottish mountains and in the high Swiss Alps.

‡* *Pachynematus clitellatus* (Lepeletier)

Pachynematus clitellatus (Lepeletier) ; Benson, 1958 : 237 and 241, figs. 794 and 813.

I have seen three ♂ of this species from East Canada : Labrador, Cartwright, 14.vii.1935 (*W. J. Brown*) and Hebron, 15.vii.1954 (*J. F. McAlpine*) ; and Quebec, Bonne-Espérance, 14.vii.1929 (*W. J. Brown*).

Gramineae.

Probably introduced into Canada from Europe.

6. REFERENCES

BENSON, R. B. 1938. European Sawflies of the genus *Xyela* Dalman (*sens. lat.*) (Hymenoptera Symphyta). *Proc. R. ent. Soc. Lond.* (B) **7** : 32–36.

—— 1943, Studies in Siricidae, especially of Europe and Southern Asia (Hymenoptera Symphyta) *Bull. ent. Res., London*, **34** : 27–51. 17 figs., 3 tables.

—— 1948. British sawflies of the genus *Pachynematus* Konow (Hymenoptera Tenthredinidae). *Ent. mon. Mag.* **84** : 58–65, 36 figs.

—— 1950. An Introduction to the natural history of British Sawflies (Hymenoptera Symphyta). *Trans. Soc. Brit. Ent.* **10** (2) : 45–142.

—— 1951, 1952 and 1958. Hymenoptera Symphyta. *Handb. Ident. Brit. Ins., London*, **6** (*2a–c*) : 252 + VI pp., 815 figs.

—— 1955. Some high alpine Nematine Sawflies (Hymenoptera Tenthredinidae). *Ent. mon. Mag.* **91** : 103–105, 10 figs.

—— 1956. Studies in Dolerini (Hymenoptera Symphyta). *Proc. R. ent. Soc. Lond.* (B) **25** : 55–63, 16 figs.

—— 1958 (see 1951).

—— 1959. Further studies on the Fenusini (Hymenoptera Tenthredinidae). *Proc. R. ent. Soc. Lond.* (B) **28** : 90–92, 4 figs.

—— 1959(*a*). Revision of the European sawflies of the *Tenthredo arcuata-schaefferi* complex (Hymenoptera Tenthredinidae). *Proc. R. ent. Soc. Lond.* (B) **28** : 93–102, 11 figs.

—— 1959(*b*). Sawflies (Hymenoptera Symphyta) of Sutherland and Wester Ross. *Ent. mon. Mag.*, **95** : 101–104, 4 figs.

—— 1960. Studies in *Pontania*. (Hymenoptera Tenthredinidae). *Bull. Brit. Mus.* (*Nat. Hist.*) *Entom.* **8** (9) : 367–384, 8 figs.

—— 1960(*a*). A new genus for the leaf-edge-rolling *Pontania* (Hymenoptera Tenthredinidae). *Ent. mon. Mag.*, **96** : 59–60, figs. 1 and 2.

—— 1960(*b*). Some more high-alpine sawflies (Hymenoptera Tenthredinidae). *Mitt. schweiz. ent. Ges.* **33** : 173–182.

—— 1960(*c*). Two new European species of *Xyela* Dalman (Hymenoptera Xyelidae). *Proc. R. ent. Soc. Lond.* (B) **29** : 110–112, 4 figs.

—— 1961. The sawflies (Hymenoptera Symphyta) of the Swiss National Park and surrounding area. *Ergebn. wiss. Unters. schweiz. Nat. Parks*, **7** (N.F.) (44) : 163–191, 1 map, 3 figs.

BURDICK, D. J. 1961. A taxonomic and biological study of the genus *Xyela* Dalman in North America. *Univ. Calif. Publ. Ent.* **17** : 285–356, 1 pl., 83 figs., 3 maps, 5 charts.

DALLA TORRE, C. G. DE. 1894. *Catalogus Hymenopterorum* 1, *Tenthredinidae incl. Uroceridae* (*Phyllophaga and Xylophaga*) 459 + viii pp.

ENSLIN, E. 1912–18. Die Tenthredinoidea Mitteleuropas **1–7**, *Dtsch. ent. Z.*, Beihefte.

FREEMAN, T. N. 1952. Some problems of insect biology in the Canadian Arctic. *Arctic.*, **5** : 175–177, with map.

—— 1958. The distribution of Arctic and Subarctic butterflies, *Proc. 10th Int. Cong. Ent., Montreal*, **1** : 659–672.

GUSSAKOVSKIJ, V. V, 1935. Chalastogastra (1), Ins. Hym., *Faune de L'URSS*, T. 11, **1** : xviii +453 pp.

HELLÉN, W. 1948. Neue paläarktische Nematinen (Hym. Tenthredinidae). *Notul. ent. Helsingf.*, **27** (1947) : 113–117.

—— 1951. in BRINCK, P. and WINGSTRAND, K. G., The mountain fauna of the Virihaure area in Swedish Lapland. *Acta Univ. lund* (*N.S.*) **46** : 71–72.

HULTÉN, E. 1950. *Atlas över Växternas utbredning i Norden. Fanerogamer och ormbunksväxter. Stockholm.*

KONOW, F. W. 1904. Revision der Nematiden–Gattung *Lygaeonematus*, *Z. syst. Hym. Dipt.*, **4** : 193–208, and 248–260.

—— 1905. Hymenoptera, Lydidae, Siricidae and Tenthredinidae *in* P. Wytsman's *Genera Insectorum*, **27–29**.

Konow, F. W. 1907. Ueber die Ausbeute der Russischen Polar Expedition an Blattwespen im arctischen Sibirien. *Res. Sci. Exp. Polaire Russe en* 1900–1903 *sous la direction du baron E. Toll*, E. Zoologie, **1** (3) : 26 + 1 pp. mit 1 Taf.

Krombein, K. V. 1958. First supplement of Muesebeck *et al.*, Hymenoptera of America north of Mexico. *Agric. Monogr.* **2** : 304 pp.

Lindroth, C. H. 1957. *The faunal connections between Europe and North America.* N. York, 344 pp.

Lindqvist, E. 1941. Zur Kenntnis einiger *Amauronematus* Arten (Hymenoptera, Tenthredinidae) *Notul. ent., Helsingf.* **20** : 56–71.

—— 1941(*a*). Einige neue Nematinen-Arten und -Aberrationen (Hym. Tenthredinidae). *Notul. ent., Helsingf.* **21** : 64–70.

—— 1944. Über die von Holmgren beschreibenen Nematinae (Hymenoptera Tenthredinidae). *Notul. ent., Helsingf.* **24** : 13–18.

—— 1944(*a*). Über einige hochnordische Nematinen (Hymenoptera, Tenthredinidae). *Notul. ent., Helsingf.* **24** : 18–24.

—— 1945, Über Blattwespen der *Amauronematus*-Gruppe. *Notul. ent. Helsingf.*, **25** : 102–8, 7 figs.

—— 1949. Neue nordische Blattwespen. *Notul. ent., Helsingf.*, **28** : 65–86, 51 figs.

—— 1952. Über alte und neue *Lygaeonematus* Arten (Hymenoptera, Tenthredinidae). *Notul. ent., Helsingf.* **32** : 80–119, 66 figs.

—— 1953. Über *Pristiphora staudingeri* Ruthe und nahverwandte Arten (Hymenoptera, Tenthredinidae). *Opusc. ent.* **18** : 220–224, 9 figs.

—— 1956. Revision einiger von schwedischen Entomologen beschriebenen Nematinen (Hymenoptera, Tenthredinidae). *Opusc. ent.* **21** : 8–14.

—— 1957–58. Neue paläarktische *Pteronidea*-Arten (Hymenoptera, Tenthredinoidea). *Notul. ent., Helsingf.*, **37** : 92–96 (1957), 97–117 (1958), 48 figs.

—— 1959. Über einige neue oder wenig bekannte *Amauronematus*-Arten (Hymenoptera, Tenthredinidae). *Notul. ent. Helsingf.* **39** : 1–15, 32 figs.

—— 1959(*a*). Neue schwarze *Pteronidea*-Arten (Hymenoptera, Tenthredinidae). *Notul. ent. Helsingf.* **39** : 54–60, 15 figs.

—— 1959(*b*). Drei neue *Amauronematus*-Arten (Hymenoptera, Tenthredinidae). *Notul. ent., Helsingf.* **39** : 127–130, 12 figs.

—— 1960. Zur Kenntnis zweier Nematinen (Hym. Tenthr.). *Notul. ent., Helsingf.* **40** (1) : 33–34.

Malaise, R., 1920–22, Beiträge zur Kenntnis schwedische Blattwespen. *Ent. Tidskr.* **41** (1920) : 97–128, **42** (1921) : 1–20, 49 figs.

—— 1931. Entomologische Ergebnisse der Schwedischen Kamtchatka–Expedition 1920–1922. 35. Tenthredinidae. *Ark. Zool.* **23**A, 8 : 1–68.

—— 1933. Eine neue Blattwespe aus Ost-Grönland. *Skr. Svalb. og Ischavet*, **53** : 3–4, fig. 1*a–c*.

Muesebeck, C. F. W., Krombein, Karl V. & Townes, Henry K., 1951, Hymenoptera of America north of Mexico, Synoptic Catalog. *Agric. Monogr.* **2** : 1420 pp.

Porsild, A. E. 1951. Plant life in the Arctic. 27 pp. (Reprint from *Canad. geogr. J.*, March, 1951.)

Rohwer, S. A. 1910. Japanese sawflies in the collection of the United States National Museum. *Proc. U.S. nat. Mus.* **39** (1777) : 99–120.

Saarinen, A. 1949. Studien über die *Amauronematus longiserra* Ths.-Gruppe (Hymenoptera Tenthredinidae). *Ann. ent. fenn.* **14** (1948) : 59–85.

—— 1949(*a*). Eine neue hochnordische Blattwespe, *Amauronematus nuorbinjargi* n. sp. (Hymenoptera Symphyta) aus Finnisch-Lappland. *Ann. ent. fenn.* **15** : 55–62, 5 figs.

—— 1950. *Amauronematus hartigi* n. sp., eine neue Blattwespenart (Hymenoptera Symphyta) aus der Sammlung Th. Hartigs in München. *Ann. ent. fenn.*, **16** : 18–24.

—— 1950(*a*). Sechs neue Arten aus der Artengruppe *Amauronematus fallax* Lep. (Hymenoptera Symphyta). *Ann. ent. fenn.* **16** : 44–63, 24 figs.

Strand, F. 1905. Coleoptera, Hymenoptera, Lepidoptera and Araneae in *Rep. 2nd Norwegian Arct. Exped. Fram.* 1898–1902, **1** (3) : 7–8.

STROBL, G. 1895. Beiträge geographischen Verbreitung Tenthrediniden, V. Theil. *Wien. ent. Ztg.*, **14** : 277–279.

ZHELOCHOVTSEV, A. N. 1935. Notes sur les Dolerinae (Hymenoptera) paléarctiques. *Arch. Mus. Zool. Univ. Moscou*, **2** : 79–83, 6 figs.